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Kawai et al

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] About a polyester polyol constituent (only henceforth polyester polyol), in detail, this invention is hypoviscosity convenient when it considers as the raw material of rigid urethane foam, and relates to the polyester polyol constituent of the soluble high physical properties of chlorofluocarbon.

[0002]

[Description of the Prior Art] Conventionally, rigid urethane foam is widely used by the outstanding heat insulation property as heat insulators, such as a building and a residence. As a raw material for manufacture of rigid urethane foam, various additives, such as a principal component of aromatic series poly isocyanate and polyol, a viscosity low laxative and a foaming agent, a catalyst, a foam stabilizer, and a flame retarder, are used.

[0003] Mixture, such as the above-mentioned polyol, a viscosity low laxative, a foaming agent, a catalyst, a foam stabilizer, and a flame retarder, is generally called system liquid, and it is made advantageous from a viewpoint of workability and workability to lower the viscosity of system liquid. The approach of increasing the quantity of foaming agents, such as additives, such as a viscosity low laxative and a flame retarder, and chlorofluocarbon, and a pentane, is common except lowering the viscosity of the polyol which is a principal component as an approach of lowering the viscosity of system liquid.

[0004]

[Problem(s) to be Solved by the Invention] However, when reducing the viscosity of system liquid with an additive, there is un-arranging [ for which the mechanical physical properties of the physical properties of the urethane foam obtained especially a mechanical strength, and dimensional stability get worse ]. Moreover, in order that the approach of increasing the quantity of foaming agents, such as chlorofluocarbon, may protect the ozone layer of the earth, use of the matter with ozone modulus of rupture, such as chlorofluocarbon especially CFC, and HCFC, disobeys the social directivity of reducing and is not desirable.

[0005] Furthermore, to the former which is using the above-mentioned chlorofluocarbon as a foaming agent, gradual reduction is guided and, on the other hand, water concomitant use is considered as law. However, when water is used together as a foaming agent, evils by a viscosity rise of system liquid and hydroxyl value rise of system liquid, such as aggravation of liquor-to-wood-ratio balance with poly isocyanate liquid, occur.

[0006] In the above-mentioned situation, although it was considered to be a quite effective means to reduce the viscosity of the polyester polyol which is a principal component, and a hydroxyl value, viscosity and a hydroxyl value have an opposite relation as the shape of general resin of polyester polyol, and when a hydroxyl value is lowered, viscosity tends to rise. As a result of repeating examination wholeheartedly, this invention person got the good result and resulted in completion of this invention.

[0007] Then, the technical problem of this invention is to improve the conventional polyester polyol by using the good result which this invention person got, and be a low hydroxyl value, and be hypoviscosity, and offer the polyester polyol constituent which may raise workability and workability when the solubility over chlorofluocarbon is high and it is used as a raw material of rigid urethane foam.

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[0008] Moreover, other technical problems of this invention are to offer the polyester polyol constituent suitable for the raw material which obtains rigid urethane foam.

[0009]

[Means for Solving the Problem] in order to attain said technical problem carried out, where one or more sorts of the fatty acid of carbon numbers 8-30, the fats and oils which makes them a component, or a fatty-acid compound are included, the polyester polyol constituent of invention of claim 1 makes polybasic acid and polyhydric alcohol react, and is obtained -- having -- hypoviscosity -- and the solubility of chlorofluocarbon is characterized by being high physical properties.

[0010] moreover, one or more sorts of compounds of the fats and oils with which invention of claim 2 for attaining said technical problem makes a component the fatty acid of carbon numbers 8-30 or them in said invention of claim 1 carried out, or a fatty-acid compound are characterized by 0.5 - 40% of the weight of the thing which it came out comparatively, and it was made to react and was acquired to the weight of a reaction mixture.

[0011]

[Embodiment of the Invention] That is, in case this invention is made to react with polybasic acid and polyhydric alcohol (an esterification reaction and an ester exchange reaction are also included.), hypoviscosity and the polyester polyol constituent of a low hydroxyl value can be obtained by using more than a kind of the fats and oils which make a principal component the fatty acid or them which were indicated to claim 1, or a fatty-acid compound as a raw material. As for compounds, such as a fatty acid included in the case of a reaction, carbon numbers 8-30 and the compound which carbon numbers 8-22 described above preferably are suitable. The polyester polyol constituent obtained by this invention has the high solubility of hydrocarbon system solvents, such as chlorofluocarbon and a pentane. The urethane foam which used this as a raw material has the description which surface hardenability (henceforth KYUA nature) goes up.

[0012] As a fatty acid obtained from the nature which demonstrates the above-mentioned engine performance, a caprylic acid, a capric acid, linolic acid, a linolenic acid, oleic acid, stearin acid, a palmitic acid, a lauric acid, a myristic acid, a ricinoleic acid, eicosapentaenoic acid, docosa-hexaenoic acid, talloil fatty acid, a hexa decene acid, an erucic acid, a melissic acid, etc. are raised with this invention, and it can use combining these one sort or two sorts or more.

[0013] Moreover, as a compounded fatty acid, an iso caprylic acid, 2-ethyl hexanoic acid, iso nonoic acid, an iso capric acid, an iso lauric acid, an iso millimeter ethyne acid, an iso palmitic acid, isostearic acid, Deccan dicarboxylic acid, dodecane dicarboxylic acid, etc. are raised, and it can use combining these one sort or two sorts or more, for example.

[0014] the fish oil represented by the animal fat represented by the vegetable oil represented by corn oil, cotton seed oil, olive oil, peanut oil, rapeseed oil, safflower oil, sesame oil, soybean oil, palm oil, palm oil, the linseed oil, castor oil, tall oil, tung oil, etc., beef tallow, lard, etc. as natural oil fat which uses the above-mentioned fatty acid as a principal component, whale oil, herring oil, etc. raises -- having -- these one sort -- or two or more sorts are combined and it is used.

[0015] A fatty acid is not limited to nature and composition not only in saturation and partial saturation, and may be used combining these. Furthermore, even if it is two or more sorts of combination chosen from a fatty acid, fatty acid ester, and the fatty-acid compound by which chemosynthesis was carried out, the polyester polyol constituent of this invention is obtained.

[0016] The fatty acids used for below are used in the semantics containing nature or a composite fatty acid, and fats and oils. About the rate to the weight of reaction constituents, such as the above-mentioned fatty acids, under by 0.5 %, effectiveness is not seen by hypoviscosity-izing of resin, and low hydroxyl value-ization, but when 40% is exceeded, the physical properties of urethane foam fall remarkably. Therefore, although 0.5 - 40% of rate has a good fatty acid to the weight of a reaction mixture as range which demonstrates effectiveness, it is 1 - 20% preferably.

[0017] moreover, as polybasic acid used for coincidence, phthalic anhydride, isophthalic acid, a terephthalic acid, naphthalene dicarboxylic acid, trimellitic acid, pyromellitic dianhydride, an adipic acid, a

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fumaric acid, a maleic anhydride, etc. raise -- having -- these -- one sort -- or two or more sorts are combined and it is used.

[0018] As the above-mentioned acid component and polyhydric alcohol made to react Ethylene glycol, a diethylene glycol, triethylene glycol, Tetraethylene glycol, a polyethylene glycol, propylene glycol, Dipropylene glycol, tripropylene glycol, 1, 2-butanediol, 1,3-butanediol, 1,4-butanediol, 2, 3-butanediol, 1,5-pentanediol, 1,6-hexanediol, a glycerol, trimethylol propane, a jig serine, pentaerythritol, methyl glucoside, etc. raise -- having -- these -- one sort -- or two or more sorts can be combined and it can use.

[0019] It reacts, and usual is mainly concerned with the reaction with the above-mentioned fatty acids, and polybasic acid and polyhydric alcohol, and it is performed by the esterification reaction. That is, in case an esterification reaction is performed for polybasic acid and polyhydric alcohol using an esterification catalyst, by throwing in fatty acids, the esterification reaction of the fatty acids can be carried out to polyhydric alcohol, and it can obtain the polyester polyol constituent of this invention.

[0020] Moreover, as approaches other than an esterification reaction, even if it carries out the ester exchange reaction of fats and oils, the polyester resin, etc. with polyhydric alcohol, the polyester polyol constituent of this invention can be obtained.

[0021] Although it is possible to generate a hydroxyl value from a high thing to a low thing by the mole ratio of an acid component and an alcoholic component about the resin physical properties of the polyester polyol of this invention, 50 - 500 KOHmg/g is desirable. Below 4.0 KOHmg/g, the acid number is and below 0.1 % of moisture is desirable.

[0022]

[Example] Next, the example and the example of a comparison of this invention are explained.

11. 4 opening flask which connected the example 1 Dimroth condenser is filled up with 38g [ of castor oil ] (it is principal component about ricinoleic acid of carbon number 18) (5 % of the weight), 462g [ of terephthalic acids ], and ethylene glycol 355g, and catalyst (organotin compound) 1.5 g, and heating dehydration is carried out under a nitrogen air current, stirring mixture. Heating dehydration was heated at 200-230 degrees C of ordinary pressure under the nitrogen air current for 3 to 4 hours. Consequently, the polyester polyol A shown in the example of Table 1 was obtained.

[0023] The polyester polyol B which shows 160g [ of example 2 castor oil ] (20 % of the weight), 340g [ of terephthalic acids ], and ethylene glycol 355g and catalyst (organotin compound) 1.5 g to the example of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0024] The polyester polyol C which shows 40g [ of example 3 palm oil fatty acid ] (it is principal component about lauric acid of carbon number 12) (5 % of the weight), 460g [ of phthalic anhydride ], and ethylene glycol 355g and 1.5g (organotin compound) of catalysts to the example of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0025] Example 4 octylic-acid methyl (carbon number 9) 20g, linolenic-acid methyl (carbon number 19) 20g (it is 5 % of the weight by ester total), 460g [ of terephthalic acids ], and ethylene glycol 355g, and catalyst (organotin compound) The polyester polyol D which shows 1.5 g to the example of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0026] The polyester polyol E which shows 3g [ of example of comparison 1 castor oil ] (0.4 weight %), 497g [ of terephthalic acids ], and ethylene glycol 355g and catalyst (organotin compound) 1.5 g to the example of a comparison of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0027] The polyester polyol F which shows 370g [ of example of comparison 2 castor oil ] (45 % of the weight), 130g [ of terephthalic acids ], and ethylene glycol 355g and catalyst (organotin compound) 1.5 g to the example of a comparison of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0028] The polyester polyol G which shows 500g [ of example of comparison 3 terephthalic acids ] and ethylene glycol 355g and catalyst (organotin compound) 1.5 g to the example of a comparison of Table 1 by the same reactor and same approach as an example 1 was obtained.

[0029] The behavioral characteristics of an urethane-ized reaction at the time of manufacturing urethane foam by using as a raw material the resin physical properties of each polyester polyol obtained in above

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mentioned examples 1-4 and examples 1-3 of a comparison, the compatibility of chlorofluorocarbon R-141b, and each polyester polyol were shown in Table 1.

[Table 1]

|                                        | 実施例    |       |        |        | 比較例    |       |        |
|----------------------------------------|--------|-------|--------|--------|--------|-------|--------|
|                                        | A      | B     | C      | D      | E      | F     | G      |
| ポリエステルポリオール                            |        |       |        |        |        |       |        |
| 水酸基価 KOHmg/g                           | 383    | 352   | 376    | 369    | 398    | 242   | 400    |
| 粘度 cps, 25 °C                          | 26,600 | 9,120 | 25,400 | 31,800 | 37,300 | 1,650 | 38,800 |
| フロン R-141b相溶性                          | 66     | 170   | 68     | 63     | 38     | 280   | 35     |
| ウレタン化反応性 クリームタイム<br>ゲルタイム<br>タックフリータイム | 20     | 20    | 20     | 20     | 20     | 20    | 20     |
|                                        | 40     | 40    | 40     | 40     | 40     | 40    | 40     |
|                                        | 43     | 42    | 44     | 45     | 49     | 43    | 50     |
| フォーム収縮 (密度27kg/m <sup>3</sup> )        | 無      | 無     | 無      | 無      | 無      | 有     | 無      |

表1中、フロン相溶性の単位は「重量部/ポリエステルポリオール100部」である。

[0030] From Table 1, when the conventional polyester polyol (G) was compared with the polyester polyol of this example A-D, each polyester polyol of an example serves as hypoviscosity, though it is a low hydroxyl value, and amelioration that the solubility of chlorofluorocarbon was also high was accepted. Furthermore, about the reaction behavior of urethane-resin-izing in urethane foam, amelioration of the KYUA nature on the front face of resin that the time amount from a gel time (time amount until resin hardens from mixing initiation of system liquid and isocyanate) to a tack free time (time amount until stickiness of a resin front face disappears from mixing initiation) becomes short was accepted, and the physical-properties fall of form contraction etc. was not seen.

[0031] Moreover, at the polyester polyol E of the example 1 of a comparison, the effectiveness of a viscosity down was thin, by the polyester polyol F of the example 2 of a comparison, the fall of the clear physical properties of form contraction in ordinary temperature was seen, and it was checked that a fatty acid cannot desire improvement in the engine performance to constituent weight also when [ 0.5 - 40% of the weight of ] it is any, if out of range.

[0032]

[Effect of the Invention] Since fatty-acid denaturation has been carried out, the polyester polyol of claim 1 and claim 2 is a low hydroxyl value, and is hypoviscosity, and has physical properties with the high solubility over chlorofluorocarbon. Therefore, when this polyester polyol constituent is used for the raw material of rigid urethane foam, a viscosity rise of system liquid can be suppressed and the workability and the workability in a manufacture site of rigid urethane foam may be raised.

[0033] According to invention of claim 2, the obtained polyester polyol is hypoviscosity and the good physical properties as which it has high chlorofluorocarbon solubility, and contraction of urethane foam is not regarded, either are held.

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